

The principles of air conditioning

Basic air conditioning system has 6 important pieces that need to be installed properly so they all can work together.

- 1) Evaporator (inside unit) Absorbs heat and humidity from inside vehicle.
- 2) Expansion valve (regulates the flow of refrigerant)
- 3) Condenser (cools refrigerant while changing back to a liquid)
- 4) Compressor (pumps refrigerant thru the system)
- 5) Receiver/drier (separates vapor from liquid refrigerant while filtering and removing moisture)
- 6) Thermostat (a device that regulates compressor cycling)

An air conditioning system is used to remove heat and humidity from the inside of the vehicle.

- A) As refrigerant changes from liquid to gas it absorbs heat in the evaporator then the gas reaches the condenser and dissipates the heat as it changes back to a liquid.
- B) Heat is absorbed thru evaporation and dissipated thru condensation.

(this is why it is important to have maximum air flow across the condenser)

System Installation

1) Compressor

- 1) **Check oil !!!!!** This can be done by removing fill plug on the top of the compressor. If there is oil visible thru the fill plug it is pre charged with oil. This is done by slightly tilting the compressor to the side. If no oil is visible call Southern Air 864-848-0601 for proper oiling instructions.
- 2) Compressor must be mounted with the outlets clocked no more than the 10 and 2 position (see illustration 3-2)
- 3) Be sure to have at least 1/3 belt wrap around compressor clutch.
- 4) Be sure to have the proper belt. Belt should not bottom out in pulley.
- 5) Compressor must run off the crankshaft. Compressor must use the crankshaft as main drive. Do not piggyback compressor off alternator or power steering.

Not using 50/50 mix of antifreeze coolant before adding any freon will void warranty.

2) Condenser

- 1) This kit uses a parallel flow condenser with has 25% more capacity than the old tube and fin type condensers. Do not be fooled by its size it has been engineered to work with Southern Air systems.
- 2) Mount condenser at least $\frac{1}{2}$ " – $\frac{3}{4}$ " off the front of the radiator.

DO NOT PLACE CONDENSER DIRECTLY AGAINST RADIATOR

Condenser must be mounted with the fins running horizontal as per the illustration (ILLUSTRATION 2-3)

- 3) Take note that the fittings on the condenser must be orientated with the large fitting (#8) on the top and the small fitting (#6) on the bottom. (ILLUSTRATION 2-3)

3) Drier

- 1) Drier must be mounted in the upright position in airflow or cool area. The drier can be mounted inside the car.
- 2) Drier is directional it is marked "IN" on the top. This is the side that connects to the condenser in front of the radiator. (ILLUSTRATION 3-2)
- 3) **DO NOT UNCAP DRIER UNTIL FINAL ASSEMBLY DOING SO WILL CONTAMINATE THE DRIER**
- 4) Replace drier if system has been opened in any way
- 5) If kit is equipped with optional binary switch see illustration (3-5)

4) Evaporator

- 1) Size evaporator to car. (Make sure to get the largest evaporator possible). Overkill is good "Jim Downs"
- 2) Mount the evaporator to a level and sturdy surface.
- 3) The bottom of the unit is a sump. Make sure the drain hole/tube is at the correct angle for proper drainage.
- 4) Avoid kinking or crushing duct hose when possible stretch duct hose to reduce turbulence and increase airflow. Avoid any sharp bends.
- 5) Do not seal unit off from the inside of the vehicle. Airflow must recirculate to properly remove humidity and heat.
- 6) Never block off unused evaporator outlets. This will cause cold spots in the coil and will eventually lead to evaporator freeze up.

- 7) Remember cold air drops. Position the vents high enough to blow on and past the passengers.
- 8) **FIREWALL MUST BE INSULATED.** The object is to get the heat out of the vehicle not create more heat.

Installation tips

- i. Insulate the entire cabin area of the vehicle. This includes under the dash, the cowl , roof and floors
- ii. Make sure all windows and doors have a good air tight seal. Most air conditioning is lost thru leaky windows and doors.
- iii. Make sure your radiator and cooling system are up to the job
- iv. Without adequate airflow the condenser cannot dissipate heat. Make sure plenty of air passes thru the condenser and radiator and exits the engine compartment. (condenser fan may be necessary in some applications)
- v. Water shutoff valve must go in the pressure side (Intake manifold) with arrow indicating "flow towards the heater core"
- vi. On some applications (LS series, LT, diesel) both heater hoses must be shut off to keep hot water out of the heater core
- vii. Be sure to open water valve and circulate coolant through the heater core upon startup to create a water barrier between the heater core and the water pump
- viii. Make clean cuts of refrigerant hose and flush out before final assembly. **Do not cut with a saw**
- ix. Lubricate o rings with a thin layer of refrigerant oil
- x. DO NOT over tighten fittings!
- xi. **And most important if you do not know what you are doing please get professional help.**

Not using 50/50 mix of antifreeze coolant before adding any freon will void warranty.

System charging

Southern Air uses r134a Freon and must be charged to r134a specs.

Normal r134a pressure: High side (160-250psi) **General rule of thumb: 2 time the ambient temperature plus 15-20%**. Low Side (10-30 psi in a steady state)
Center duct temperature should be 36-46 degrees F.

- Evacuate the system for a **minimum** of 1 hour. Let stand for 1 hour and check for leak down. System should hold a vacuum for at least an hour.
- Before opening any ports on the engine, be sure to bleed Freon at the engine and gauges before opening low side tap.
- Most Southern Air kits take no more than 20-24 oz. depending on length of hoses.
- Always refer to the gauges for proper charge.
- Never open high side tap while engine is running!
- If you are not familiar with how to use 134 gauges, please seek the help of an air conditioning professional.
- **DO NOT ADD FREON WITH LEAK DETECTOR (DYE) OR LEAK SEALER**
 - These types of Freon are saturated with oil. Adding these would add too much oil to the system causing damage.
 - If you need to add dye, add concentrated dye through the suction hose. ½ tablespoon is plenty.

Warranty is void if the following occurs:

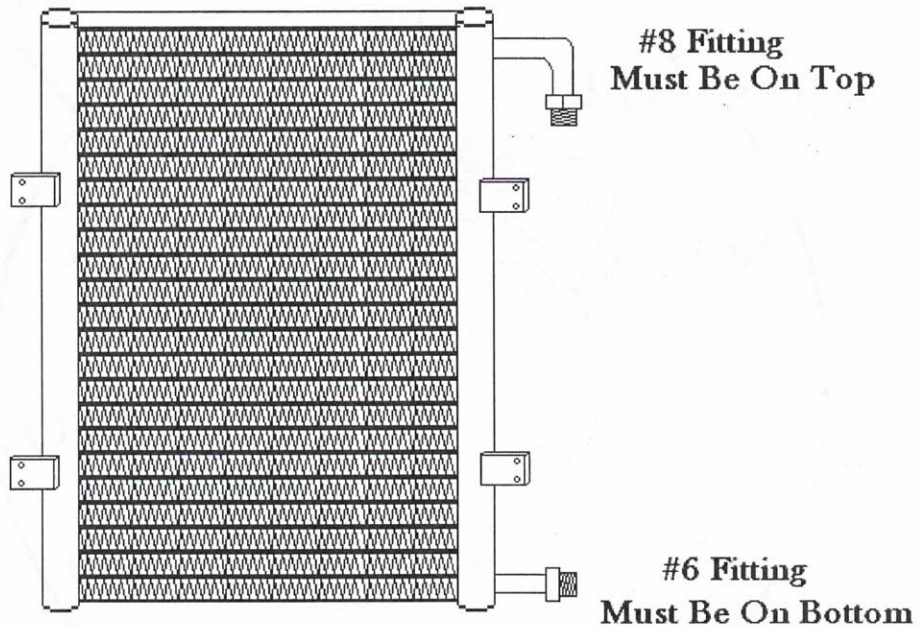
- Compressor mounted improperly (ex. Outlets mounted facing down)
- Compressor distorted during mounting process (Ex. Cobbled up bracketry)
- Condenser mounted wrong (Illustration 2-3)
- Over charging of the system
- Over oiling of the system-Check compressor oil before charging as per section 1-1 !!!
- Continuing to operate when problem is obvious
- Not using proper 50/50 mix of antifreeze/coolant
- Any modifications to any of the components received from Southern Air

Condenser Orientation

Illustration 2-3

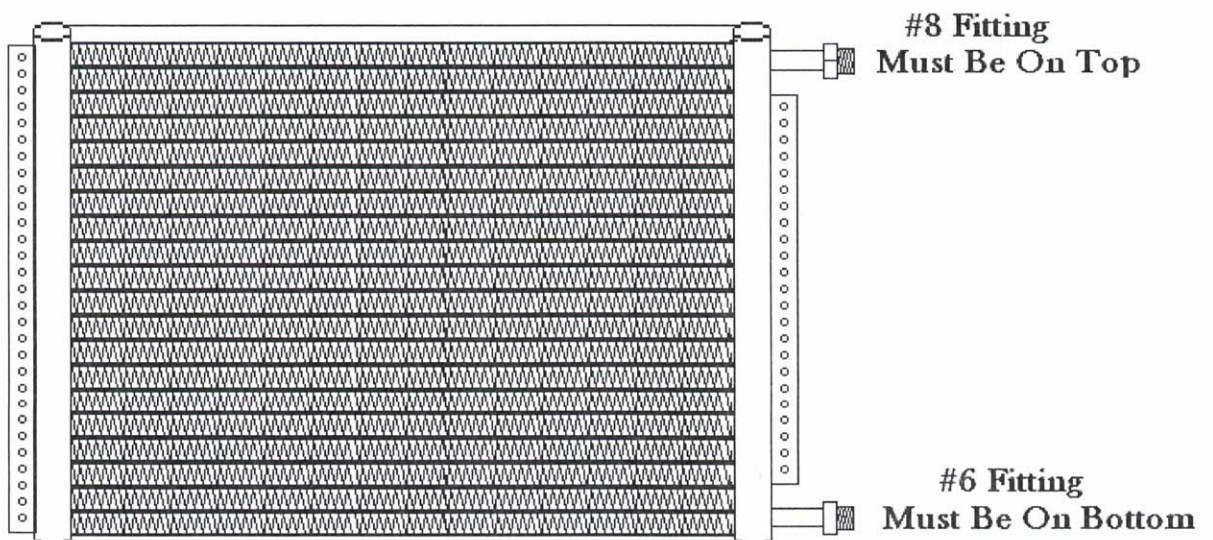
Pre-1948

(Pt# 100012)



Post-1948

(Pt# 100009)

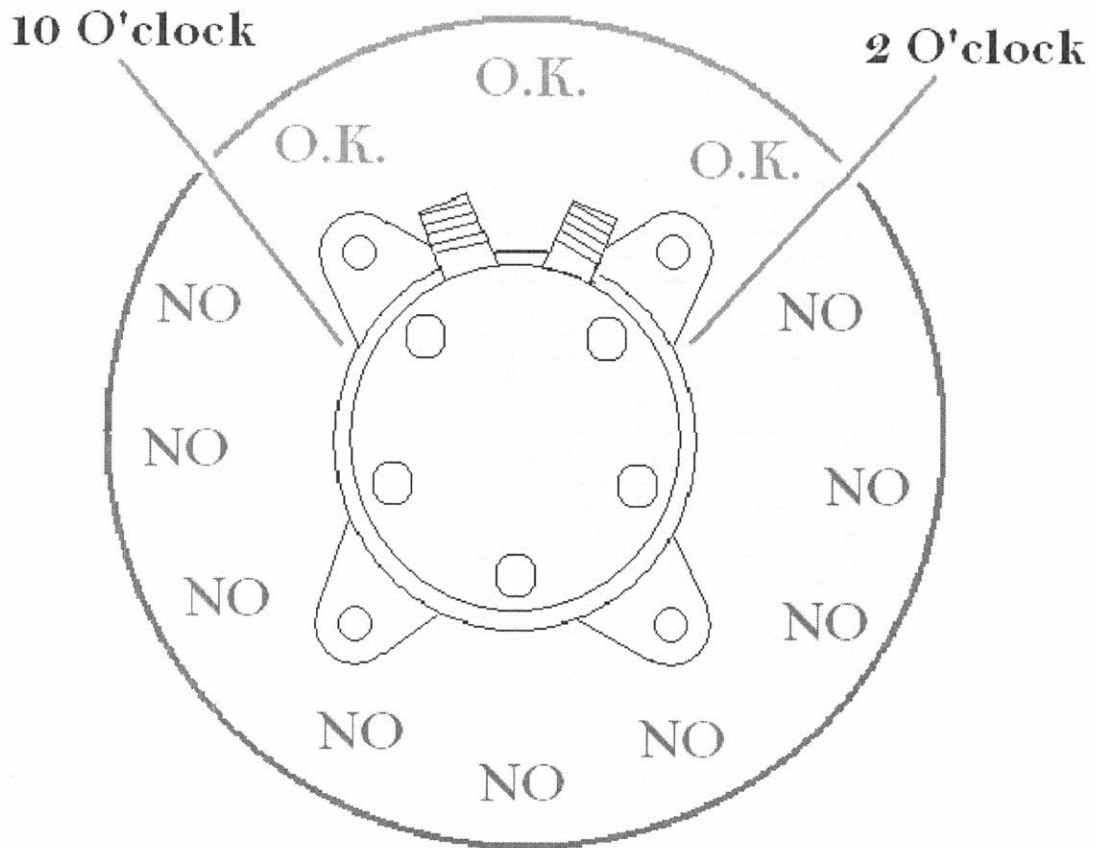


Pre-48 and Post-48 is a general recommendation. Measure your radiator to determine if you would prefer one or the other for your application.

Condensers may be mounted with the fittings on the passenger side or the drivers side, however the condenser MUST always have the larger (#8) fitting on top and the smaller (#6) fitting on the bottom.

AC Compressor Mounting

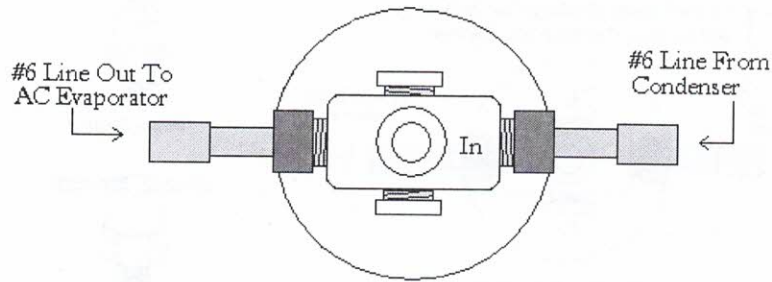
Fig. 3-2



Suction And Discharge Fittings Must
Not Be Rotated Past 10 Or 2 O'clock

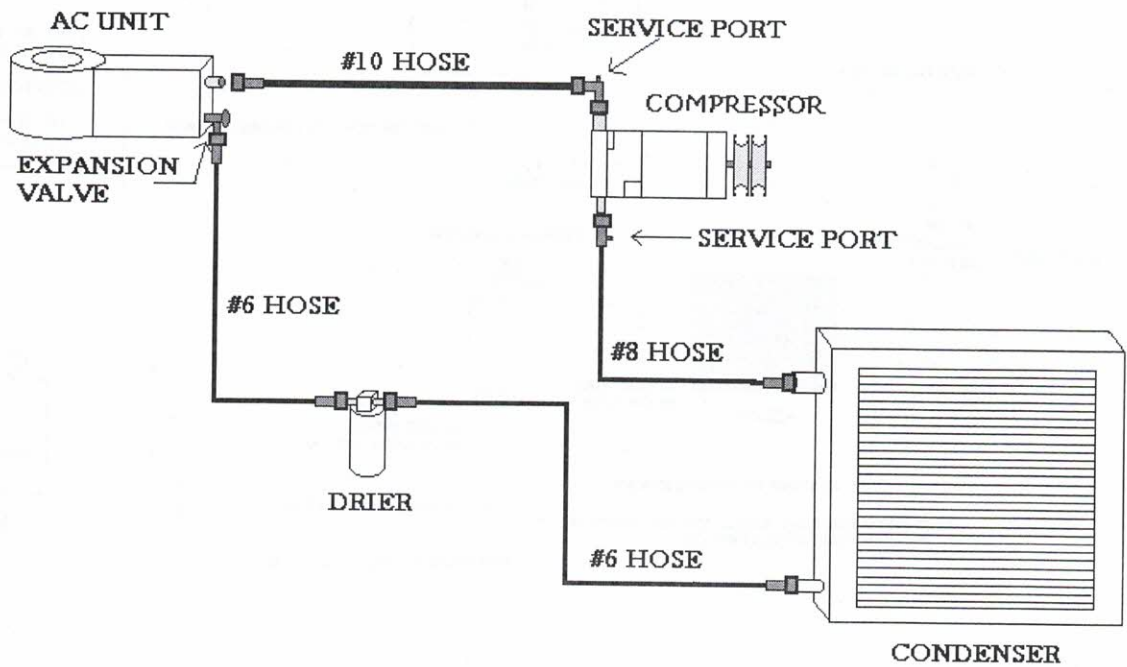
AC DRIER AND HOSE ROUTING

Illustration 3-2



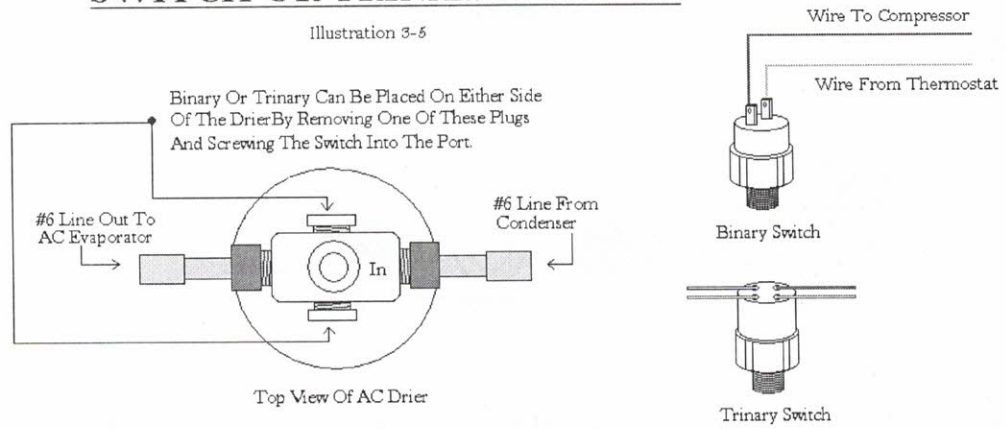
Top View Of AC Drier

AC HOSE ROUTING



LOCATION OF OPTIONAL BINARY SWITCH OR TRINARY SWITCH

Illustration 3-5



TRINARY SWITCH WIRING INSTRUCTIONS

